

Borehole

**50-02-09****Log Event A****Borehole Information**

Farm : <u>T</u>	Tank : <u>T-102</u>	Site Number : <u>299-W10-119</u>
N-Coord : <u>43,630</u>	W-Coord : <u>75,780</u>	TOC Elevation : <u>672.00</u>
Water Level, ft : <u>69.1</u>	Date Drilled : <u>7/31/1973</u>	

**Casing Record**

Type : <u>Steel-welded</u>	Thickness, in. : <u>0.237</u>	ID, in. : <u>4</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>91</u>	
Type : <u>Steel-welded</u>	Thickness, in. : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>91</u>	

Cement Bottom, ft. : 91      Cement Top, ft. : 0

**Borehole Notes:**

Borehole 50-02-09 was originally drilled in July 1973 and completed at a depth of 91 ft using 6-in.-diameter casing. In August 1980, the original 6-in. casing was perforated from 0 to 20 ft and 89 to 91 ft, a 4-in. casing was installed inside the 6-in. casing, and the annular space was filled with grout.

The zero reference for the SGLS was the top of the 4-in. casing, which is approximately even with the ground surface.

**Equipment Information**

Logging System : <u>2B</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>10/1997</u>	Calibration Reference : <u>GJO-HAN-14</u>	Logging Procedure : <u>MAC-VZCP 1.7.10-1</u>

**Logging Information**

Log Run Number : <u>1</u>	Log Run Date : <u>06/08/1998</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>200</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>10.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>06/09/1998</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>9.0</u>	Counting Time, sec.: <u>200</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>71.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Borehole

**50-02-09****Log Event A**

Log Run Number :	<u>3</u>	Log Run Date :	<u>06/10/1998</u>	Logging Engineer:	<u>Alan Pearson</u>
Start Depth, ft.:	<u>87.5</u>	Counting Time, sec.:	<u>200</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>70.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

**Logging Operation Notes:**

This borehole was logged by the SGLS in three log runs operating in the move-stop-acquire mode, stopping every 6 in. and collecting spectra data for 200 s. The total logging depth achieved was 87.5 ft. During logging, this borehole contained standing water below 69.1 ft.

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**Analysis Information**

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Analyst : R.R. SpatzData Processing Reference : MAC-VZCP 1.7.9Analysis Date : 09/02/1998**Analysis Notes :**

The pre-survey and post-survey field verification for each logging run met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from the accepted calibration spectrum that most closely matched the field data were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

The casing correction factor for a 0.50-in.-thick steel casing was applied to the concentration data during the analysis process. This casing correction factor was applied because it most closely matched the 0.517-in. total combined thickness of the 4-in. and 6-in. casings. A grout correction was not made because none is available. A water correction was not applied because none is available for 4-in.-diameter boreholes. Use of this casing correction factor will cause radionuclide concentrations to be underestimated.

**Log Plot Notes:**

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A time-sequence plot of historical gross gamma-ray data collected between 1975 and 1994 is included.

**Results/Interpretations:**

The radionuclide concentrations identified in this section are reported as apparent concentrations only and are underestimated.



# Spectral Gamma-Ray Borehole Log Data Report

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The man-made radionuclides Cs-137, Co-60, and Eu-154 were detected by the SGLS around this borehole. The Cs-137 contamination was detected continuously from the ground surface to 12 ft at concentrations ranging from 0.15 to 0.6 pCi/g. Cs-137 contamination was detected intermittently from 13 ft to the bottom of the logged interval (87.5 ft) at apparent concentrations ranging from 0.15 to 5 pCi/g. The maximum apparent Cs-137 concentration of 5 pCi/g was detected at 24.5 ft.

Co-60 contamination was detected continuously from 39.5 to 45.5 ft at apparent concentrations ranging from 0.1 to just over 1 pCi/g. The maximum apparent Co-60 concentration of 1.3 pCi/g was detected at the 40.5-ft depth.

Eu-154 contamination was detected continuously between 40.5 and 42 ft at apparent concentrations ranging from 0.4 to 1.3 pCi/g.

K-40 concentrations increase from a general background of 10 pCi/g above 38 ft to about 13 pCi/g between 38 and 48 ft. U-238 concentrations increase between 38 and 40 ft. Between 48 ft and the bottom of the logged interval (87.5 ft), the K-40 concentrations steadily increase from about 9 to 12 pCi/g. Below 81 ft, the U-238 and Th-232 concentrations increase.